



May 2014

**GENERAL USE LEVEL DESIGNATION FOR BASIC (TSS), ENHANCED, &
PHOSPHORUS TREATMENT**

For

Washington State Department of Transportation's Media Filter Drain (MFD)

Ecology's Decision:

Based on the Washington State Department of Transportation (WSDOT) application submissions, Ecology hereby issues the following use level designations for the WSDOT Media Filter Drain (MFD):

- 1. A General Use Level Designation for Basic (TSS) Treatment.**
- 2. A General Use Level Designation for Enhanced Treatment.**
- 3. A General Use Level Designation for Phosphorus Treatment*.**
- 4. These General Use Level Designations have no expiration date but may be revoked or amended by Ecology, and are subject to the conditions specified below.**

*(*Alternative configurations with compost blanket do not have a General Use Level Designation for Phosphorus Treatment.)*

Ecology's Conditions of Use:

Design, install, and maintain media Filter Drains (Type 1, Type 2, and Type 3) to comply with these conditions:

- 1. Each MFD shall be designed as per Section 5-4.1.3 (RT.07 – Media Filter Drain) of the WSDOT 2014 Highway Runoff Manual (HRM).**
- 2. The MFD Ecology Mix will consist of materials identified in RT.07 of the WSDOT 2014 Highway Runoff Manual.**
- 3. Construct the MFD facility as per RT.07 of the WSDOT 2014 Highway Runoff Manual.**
- 4. Maintain the MFD facility per the maintenance standards for media filter drains in the WSDOT 2014 HRM.**
- 5. Follow any post publication updates to the HRM. You can find updates at the WSDOT HRM website:**
[http://www.wsdot.wa.gov/Environment/WaterQuality/Runoff/HighwayRunoffManual.](http://www.wsdot.wa.gov/Environment/WaterQuality/Runoff/HighwayRunoffManual)

6. WSDOT shall make readily available those documents deemed public information and make this information available upon request and in a timely manner.
7. Discharges from the MFD shall not cause or contribute to water quality standards violations in receiving waters.

Approved Alternate Configurations:

MFD (Type 1, Type 2, and Type 3) with 3-inch Medium Compost Blanket and Grass

1. The MFD with 3-inch medium compost blanket and grass over the grass strip and media mix zone provides additional flexibility to the stormwater best management practice (BMP). You can reduce noxious weeds and unwanted vegetation by placing a compost blanket and grass over the media mix zone.
2. The compost used for the 3-inch compost blanket will conform to WSDOT Standard Specification 9-14.4(8) for medium compost.
3. The MFD with 3-inch medium compost blanket and grass configuration does not have a General Use Level Designation for Phosphorous Treatment.
4. The MFD (Type 1, Type 2, and Type 3) shall be constructed without the 3-inch medium compost blanket and grass when discharging in phosphorous-sensitive areas or phosphorous total maximum daily load (TMDL) areas.

MFD end-of-pipe configuration (Type 4 and Type 5) with 3-inch Medium Compost Blanket and Grass

1. The MFD end-of-pipe configuration (Type 4 and Type 5) shall be designed, constructed, maintained, and consist of the materials as per Section 5-4.1.3 (RT.07 – Media Filter Drain) of the WSDOT 2014 Highway Runoff Manual (HRM)
2. The MFD Type 4 and Type 5 have the same compost blanket and grass requirements and use level designations as the MFD Type 1, Type 2, and Type 3, shown above.
3. The MFD Type 4 and Type 5 do not have a General Use Level Designation for Phosphorous Treatment.
4. Construct the MFD Type 4 and Type 5 without the 3-inch medium compost blanket and grass when discharging in phosphorous-sensitive areas or phosphorous total maximum daily load (TMDL) areas.

MFD end of pipe configuration (Type 6 and Type 7), downstream of a flow control BMP, with 3-inch Medium Compost Blanket and Grass

1. The MFD end-of-pipe configuration (Type 6 and Type 7), downstream of a flow control BMP shall be designed, constructed, maintained, and consist of the materials as per Section 5-4.1.3 (RT.07 – Media Filter Drain) of the WSDOT 2014 Highway Runoff Manual (HRM)
2. Construct the MFD Type 6 and Type 7 with the 3-inch medium compost blanket and grass and shall have the same compost blanket and grass requirements and use level designations as the MFD Type 1, Type 2, and Type 3, shown above.

3. The MFD Type 6 and Type 7 do not have a General Use Level Designation for Phosphorous Treatment.
4. Do not construct the MFD Type 6 and Type 7 in phosphorous-sensitive areas or phosphorous total maximum daily load (TMDL) areas.

Applicant: Washington State Department of Transportation (WSDOT)
Applicant's Address: Design Office
PO Box 47329
Olympia, WA 98504-7329

Application Documents:

- *Technology Evaluation and Engineering Report* : WSDOT Media Filter Drain; Prepared for Washington State Department of Transportation (Herrera Environmental Consultants, July 2006)
- *Technical Evaluation Report for the Media Filter Drain BMP Option: Downstream of Detention BMPs*: Prepared by the WSDOT I-405 Corridor Program, May 2013

Applicant's Use Level Request:

General Use Level Designation for Basic, Enhanced, and Phosphorus Treatment in accordance with Table 2 of Ecology's 2011 *Technical Guidance Manual for Evaluating Emerging Stormwater Treatment Technologies Technology Assessment Protocol – Ecology (TAPE)*.

For the alternative configuration of the MFD with 3-inch medium compost blanket and grass, General Use Level Designation for Basic and Enhanced Treatment in accordance with Table 2 of Ecology's 2011 *Technical Guidance Manual for Evaluating Emerging Stormwater Treatment Technologies Technology Assessment Protocol – Ecology (TAPE)*.

Applicant's Performance Claims:

The Media Filter Drain removes suspended solids, phosphorus*, and metals from highway runoff through physical straining, ion exchange, carbonate precipitation, and biofiltration. WSDOT expects the combination of treatment processes to achieve Ecology's treatment goals for basic, enhanced, and phosphorus* treatment. (*Alternative configurations with compost blanket do not remove phosphorus.)

Ecology's Recommendation:

Ecology finds:

Ecology expects the Media Filter Drain, when sized according to WSDOT RT.07, to provide effective stormwater treatment achieving Ecology's basic, enhanced, and phosphorus performance goals as demonstrated by field-testing performed in accordance with the TAPE

protocol; and Ecology deems the Media Filter Drain satisfactory with respect to factors other than treatment performance.

Findings of Fact:

1. WSDOT conducted water quality monitoring at the Media Filter Drain test site over a five-year period from 2001 to 2005.
2. WSDOT collected 25 sample events in three phases.
3. For the 12 storms with influent TSS concentrations less than 100 mg/L, the median influent was 59 mg/L and the median effluent was 3.9 mg/L. For the 13 storms with influent concentrations greater than 100 mg/L, the median percent removal was 96.0%.
4. For all storm events, the median percent removal of total phosphorus was 85.7% with a median influent of 0.234 mg/L.
5. For all storm events, the median percent removal of dissolved zinc was 80.8% with a median influent of 120 µg/L.
6. For all storm events, the median percent removal of dissolved copper was 40.8% with a median influent of 16 µg/L.
7. WSDOT performed a water budget analysis on the Media Filter Drain to determine if losses were occurring within the system due to infiltration, bypass, and/or evaporation. The percentage of influent accounted for in the effluent ranged from zero to 120 percent with a median of 38 percent. Bypassing the system did not likely cause water loss values because WSDOT only observed bypass on one occasion.

Technology Description:

The Media Filter Drain is a flow-through water quality treatment device developed for use where available right-of-way is limited and longitudinal gradients are less than 5%. The Media Filter Drain, which can be sited on both highway side slopes and medians, uses infiltration through a pervious, alkalinity-generating media, called the Media Filter Drain Mix, that was designed to remove suspended solids and soluble metals from highway runoff through physical straining, ion exchange, carbonate precipitation, and biofiltration. For illustrations, design specifications and maintenance criteria contact WSDOT.

Remaining Issues or Concerns about the MFD Technology:

1. Maintenance and replacement. How do pollutant removal efficiency and hydraulic capacity decrease over time, and at what point is maintenance or replacement required? WSDOT can accomplish this by periodic water quality testing at the SR 167 test site.
2. If possible, WSDOT should test a different MFD facility in the future. They should select the location to verify slope or soil-related siting limitations. The testing should carefully monitor water balance.

Contact Information:

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Applicant's Website: <http://www.wsdot.wa.gov/Environment/WaterQuality/default.htm>

Highway Runoff Manual Website:
<http://www.wsdot.wa.gov/Environment/WaterQuality/Runoff/HighwayRunoffManual.htm>

Ecology web link: <http://www.ecy.wa.gov/programs/wq/stormwater/newtech/technologies.html>

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Revision History

Date	Revision
April 2007	Original Draft use-level-designation document
February 2010	Revised Ecology Contact Information
January 2013	Modified Design Storm Description, added Revision Table, Revised format to meet Ecology Standards
February 2013	Added MFD Alternative Configuration
March 2014	Updated HRM references to 2014, added MFD Type designations 1-7, and added descriptions for alternative configurations MFD Type 4, Type 5, Type 6, and Type 7.